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State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

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January 29, 2001

Tim Kirschbaum, Environmental Engineer
Consolidation Coal Company
P. O. Box 566
Sesser, Illinois 62884

Re: Review of Biology Sections of the Emery Deep Mining and Reclamation Plan, Consolidation Coal Company, Emery Deep Mine, C/015/015, Outgoing File

Dear Mr. Kirschbaum:

The Division has completed a review of the biology sections of the Mining and Reclamation Plan for the Emery Deep Mine. This review was not prompted by any particular action on your part or by any observations of on-the-ground problems. Rather, these sections have not been reviewed in many years, and some portions may never have been reviewed. Over the years, we have observed some problems in the plan, and feel that by taking care of them now we can avoid compliance problems in the future.

The enclosed technical analysis discusses the deficiencies we identified. Please submit an application for permit change to respond to this review by March 16, 2001. If you have any questions about it, please call Paul Baker at 801-538-5261.

Sincerely,

Daron R. Haddock
Permit Supervisor

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Enclosure:
cc: Price Field Office
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State of Utah

Utah Oil Gas and Mining

Coal Regulatory Program

Emery Deep Mine
Review of Biology Sections
C/015/015
Technical Analysis
January 25, 2001

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TECHNICAL ANALYSIS

INTRODUCTION

The biology portions of the Emery Deep mining and reclamation plan have not been reviewed in at least the last ten years and possibly in twenty years. Some of the biology baseline information needs to be updated, and several sections of the reclamation plan need to be modified to incorporate methods used in the test plots and at other mines. Some of the revegetation success standards are not acceptable or are incomplete.

SUMMARY OF OUTSTANDING DEFICIENCIES

R645-301-341.250, The permittee needs to propose success standards for the areas disturbed by mining before 1977. 16

R645-301-341.250, The plan gives no indication whether the reference areas have ever been checked for range condition by the Soil Conservation Service or the Natural Resources Conservation Service. To be acceptable, they need to be in fair or better range condition. 16

R645-301-341.250, The plan needs to contain success standards and methods for measuring diversity, seasonality, and erosion control. 16

R645-301-341, Section III.B.1 says soils under the roads *may* (emphasis added) be tested for physical and chemical parameters. No area should be excluded from soil testing. 15

R645-301-341, The surface preparation techniques need to be revised. It is vital that the permittee use the best methods available to increase the amount of available water. This could be done with limited surface roughening and irrigation, but if irrigation is not used, it will probably be necessary to implement extreme surface roughening, such as gouging pits about 12-18 inches deep and three feet in diameter. The plan also needs to show how compaction will be reduced and seed spread as soon as possible after surface preparation techniques are completed in an area. 15

R645-301-342, The plan needs to show the permittee is using the best technology currently available to enhance wildlife habitat during reclamation. If enhancement is not feasible, the plan needs to contain a statement to this effect and discuss why it is not feasible. 16

ENVIRONMENTAL RESOURCE INFORMATION

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR 783., et. al.

VEGETATION RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.19; R645-301-320.

Analysis:

The mining and reclamation plan shows nine vegetation communities within the Emery Deep permit area. Plate VIII-1 shows the locations of these communities and a surface operations area including proposed disturbances. While it is impossible to know what vegetation communities existed in pre-law disturbance areas, adjacent communities are greasewood shrubland, riparian shrubland, and mixed desert shrubland. Other communities that have been or would be disturbed include an annual forb community and riparian meadow.

Dominant species, total cover, and production are shown for the predominant communities, and the plan also includes a list of all species encountered in vegetation sampling.

Appropriateness of the vegetation reference areas is discussed under revegetation.

Findings:

Information provided in the mining and reclamation plan is considered adequate to meet the requirements of this section of the regulations.

FISH AND WILDLIFE RESOURCE INFORMATION

Regulatory Reference: 30 CFR 784.21; R645-301-322.

Analysis:

Fish and Wildlife Information

Baseline wildlife information is in Appendix IX-1. Most of this information was gathered in a 1980 study which included aerial survey followed by ground truthing. Most pf the permit area is critical habitat for ring-necked pheasants. The riparian areas along Christiansen Wash, Quitchupah Creek, and an unnamed stream are also critical wildlife habitats.

A burrowing owl was found near a prairie dog town. While the permittee's consultant only saw one owl and no chicks, the area does appears to have good habitat for this species. Burrowing owls are classified by the State Division of Wildlife Resources as a species of concern because f declining populations.

The only other raptor found in the wildlife survey was an American kestrel. Trees along the streams have some large nests that could be used by raptors, but these nests were not active. There are several species that could make large nests such as these, including both raptors and corvids.

A few deer can sometimes be found in the area, and elk are sometimes forced to come down from higher rangelands because of heavy snow. Pronghorns are not known to occur in the area although there is probably a limited amount of habitat.

The wildlife study included surveys for macroinvertebrates in the streams. Because of poor substrate quality, there is limited potential for macroinvertebrates; however, there are some in certain stretches. Species richness decreases markedly in certain stretches of the stream, and it happens that these are immediately below mine water discharge points. The report explains this is probably due to a change in the substrate quality rather than a result of the effluent; nevertheless, the Division should confirm the conditions discussed in the report.

The permit area contained several white-tailed prairie dog towns, so the consultant searched for any sign of black-footed ferrets and found none.

Threatened and Endangered Species

The information in Section VIII.B.4 needs to be updated to include a current list of threatened, endangered, and candidate species that might occur in the permit area. This section of the plan lists threatened, endangered, and sensitive plant species that were known to occur in the area in 1981. *Echinocactus whipplei* var. *spinosior* and *Cryptantha jonesiana* are no longer listed as threatened or endangered or as candidate species. *Sclerocactus wrightiae* is correctly shown as an endangered species, but the plan indicates *Townsendia aprica* is a candidate threatened species where it is actually listed. There are other listed species, both plants and animals, with some potential of occurring in the permit area or being adversely affected by mining and reclamation operations.

Information currently in the plan should not be completely deleted; the plan should contain all available information about searches that were done for listed species. Although the permit area could contain species that have been listed since the time the original field work was done, the Division is not requiring additional field work at this time. However, if the permittee proposes to disturb new areas, surveys for species potentially in proposed disturbed areas would be needed. In addition, the Division and the Fish and Wildlife Service would need to examine potential effects on the threatened and endangered fish species of the upper Colorado River if the mine begins operating again.

Findings:

Information provided in the mining and reclamation plan is not considered adequate to meet the requirements of this section of the regulations. The permittee needs to provide the following information:

R645-301-322, The permittee needs to update the list of threatened, endangered, and candidate species that could occur in the permit area.

The Division should confirm the stream conditions discussed in the consultant's report.

If the permittee decides to proceed with any development plans that include new disturbance, the areas to be disturbed will need to be checked for threatened and endangered species. In addition, the Division and the Fish and Wildlife Service would need to examine potential effects on the threatened and endangered fish species of the upper Colorado River if the mine begins operating again.

OPERATION PLAN

INTERIM REVEGETATION

Regulatory Reference: R645-301-330, -301-331, -301-332.

Analysis:

Section VIII.C.3 has two species lists that could be used for contemporaneous reclamation. The phrase "contemporaneous reclamation" has, in the past, often been used synonymously with interim or temporary revegetation. Section III.A.1, page 6, mentions a temporary seed mix described in Chapter VIII.C.3. The only seed mixes in this section are the contemporaneous seed mixes; therefore, it is assumed the mixes shown in Section VIII.C.3 are for interim revegetation. If this is correct, wording in the plan needs to be changed.

Other than the seed mixes, the plan gives no methods that would be used for interim revegetation. Reclamation of certain specific areas is described, but methods are not shown for future interim revegetation areas. The plan could potentially refer to the plan for final reclamation to show seeding, mulching, and other revegetation methods to be used.

Findings:

Information provided in the mining and reclamation plan is not considered adequate to meet the requirements of this section. The permittee needs to provide the following information:

R645-301-331, The permittee needs to clarify whether the species lists in Section VIII.C.3 are truly for contemporaneous reclamation, in other words permanent reclamation occurring contemporaneously with operations, or if they are for interim revegetation. If they are not for interim revegetation, the plan needs to show what species will be used for this purpose. Also, the plan needs to show what methods would be used to prepare the soil, seed, and mulch for interim revegetation.

FISH AND WILDLIFE INFORMATION

Regulatory Reference: 30 CFR Sec. 784.21, 817.97; R645-301-322, -301-333, -301-342, -301-358.

Analysis:

The fish and wildlife protection plan is in Chapter IX, Section 817.97. The primary impacts are reduced habitat in the actual disturbed areas and some reduction of habitat quality in adjacent areas. There is also some disruption of movement patterns.

Mitigative measures include educating mine employees about wildlife, and they are advised to not harass wildlife, particularly during high stress periods. All hazards associated with mining activities are appropriately fenced. Water quantity and quality are maintained in all streams. It appears that power lines were designed to be safe for raptors.

The Division is not aware of additional protective measures that need to be implemented at this time. The permittee is required to use the best technology currently available to protect wildlife and enhance wildlife habitat.

Findings:

Information provided in the mining and reclamation plan is adequate to meet the requirements of this section of the regulations.

RECLAMATION PLAN

REVEGETATION

Regulatory Reference: 30 CFR Sec. 785.18, 817.111, 817.113, 817.114, 817.116; R645-301-244, -301-353, -301-354, -301-355, -301-356, -302-280, -302-281, -302-282, -302-283, -302-284.

Analysis:

Revegetation Techniques

The mining and reclamation plan says the soil will be tested and amendments added according to these results. However, in Section III.B.1, page 10, it says soils under the roads *may* (emphasis added) be tested for physical and chemical parameters. No area should be excluded from soil testing.

A firm seedbed will be prepared through discing, cultivating, harrowing, and other practices that are necessary depending on the soil conditions. Fertilizer will be broadcast and incorporated in the soil during seedbed preparation. Roadbeds will be ripped, plowed or scarified.

It is not necessary to prepare a firm seedbed. The most important aspects of seedbed preparation for an area being reclaimed to wildland characteristics are to reduce compaction, leave a roughened surface, and seed as soon after the seedbed is prepared as possible. These practices are considered essential for establishing vegetation at this site. The mining and reclamation plan needs to discuss in greater detail how soil compaction will be reduced and what water harvesting methods will be used. For example, the plan says roadbeds will be ripped, plowed, or scarified, but it does not say how deeply they might be ripped or what interval there would be between ripped areas (how far between shanks). These methods alone would not harvest enough water to result in successful reclamation unless there were unusually favorable weather conditions.

As an alternative to water harvesting, the permittee could propose using irrigation. Details of the irrigation plan would need to be presented, however.

The test plots had varying degrees of success, but the highest vegetation cover was clearly in some depressions where water was able to accumulate. Some of these areas had close to 100% vegetative cover. Other treatments, especially irrigation, had some positive effect but not nearly as much as the depressions which were not created intentionally.

The Division recommends creating a roughened surface using a trackhoe or similar equipment to make gouges in the entire area being revegetated. Gouges could be about three feet in diameter and about one foot deep. Other roughening or water harvesting techniques are available and would be considered.

Section III.F.1 of the plan says there will be three potential seeding periods: early spring before June 1, early fall between August 10 and September 10 provided adequate soil moisture is available, and late fall after October 20. Experience at this and nearby mines indicates spring and late summer seedings are not likely to be successful; however, seeding warm season species earlier in the summer,

such as mid- to late July, has proven effective at some mines in the southwest. Early in the spring and in the late summer, moisture is not reliably available for long enough periods to allow seedlings to become established. Unless the permittee can show that seeding in the spring and late summer can be successful, these times should be eliminated from the plan. The Division is not certain whether summer rains are reliable enough for seeding warm season species in July, but the applicant could try seeding then. The cool season species should definitely be seeded in the fall. Even then, winter and spring precipitation are not always completely reliable at this site, so reseeding could be necessary.

Section VIII.C.4 has seed mixes that will be used to revegetate the mixed desert shrub and annual forb community, the greasewood community, and the riparian community. Except yellow sweet clover and alfalfa, every species in the seed mixes is native to Utah. Alfalfa is not a problem, and while yellow sweet clover has been used successfully at several Utah mines, it is probably not essential for establishing vegetation. Yellow sweet clover can be invasive, and there are reports it could have allelopathic properties. It may help decrease the number of weeds and may also be a host for nitrogen fixing bacteria, but the seeding rate shown in the plan is excessive. The seeding rate should be reduced to about 0.5 pounds per acre pure live seed.

Based on the ecology of some species and results from the test plots, the Division recommends some changes to the seed mixes. While these are recommendations and are not required, they should result in better revegetation results.

1. Add mat saltbush (*Atriplex corrugata*)to the arid mix.

2. Specify Castle Valley clover (*Atriplex gardneri* Var. *cuneata*) in place of Gardner saltbush for both the mesic and arid mixes. Castle Valley clover is a subspecies of Gardner saltbush, and it is adapted to the area. There are several other subspecies of Gardner saltbush, some of which are not adapted.

3. Replace sand dropseed with alkali sacaton (*Sporobolus airoides*) planted at the rate of 0.25 pounds PLS/acre in the mesic mix. Sand dropseed is listed twice in this mix.

4. Delete Wood's rose and Indian blanket from the riparian mix.

5. Add trident saltbush (*Atriplex gardneri* Var. *tridentata*) at the rate of one pound PLS/acre to the mesic and riparian mixes.

6. Replace spike muhly with alkali muhly (*Muhlenbergia asperifolia*) in the riparian mix. Spike muhly grows on dry open hillsides near Gamble oak and Ponderosa pines, vegetation communities not found in the disturbed area.

The permittee needs to supply scientific names of the species in the seed mixes. While the Division is familiar with most of the common names used, there are some that correspond to more than one species or that are not shown in publications on the flora of the area.

Some species in the seed mixes, including species recommended above, may not be available at the time of reclamation, particularly if the permittee does not order them well in advance. The Division

recommends that the mining and reclamation plan should contain a statement indicating what will happen if seed is not available. The permittee could commit to consult with the Division if this happens and document in the annual report what substitutions were made.

Although it is probably possible to revegetate the site using only seed, some species of transplants were moderately successful in the test plots. The permittee should consider planting seedlings of some species, such as fourwing saltbush and mat saltbush.

The plan says all grass and shrub seed will be planted using a drill but does not give other details about seeding methods. Drilling seed is not compatible with having a roughened surface, and several species in the seed mixes need to be seeded on the surface. The Division recommends broadcast seeding, possibly followed by raking.

Mulch will be applied on all graded areas where suitable plant growth material has been respread. One ton per acre of straw or hay will be applied in areas with slopes of 0-10%, and straw or hay will be applied at the rate of two tons per acre on steeper slopes. This mulch will then be crimped to anchor it.

The application does not describe how the mulch would be crimped. Some operators have attempted to crimp hay or straw mulch with the teeth of a trackhoe, and although this does not reduce roughening, it is not terribly effective at anchoring the mulch. Crimping with a disk is likely to reduce surface roughness and should not be used. Other methods of anchoring the straw include overspraying it with wood fiber mulch and tackifier or covering it with a degradable netting. Both of these methods work well.

The Division recommends, but does not require, using certified noxious weed free straw or hay as mulch. Certified straw and hay are required on federal lands. Straw or hay mulch can be a significant source of noxious weed seeds.

The plan discusses other methods that may be used to control erosion, including terracing, riprapping, using organic tackifiers, wood fiber mulch, or straw bale dikes. If used properly, these methods are all effective. In the Division's experience, gouges, as discussed above, are very effective at controlling erosion and sedimentation.

Section III.G.2 discusses revegetation and erosion monitoring and maintenance. All rills an gullies nine inches or more deep will be backfilled or graded, reseeded and mulched or otherwise stabilized. Certain other normal conservation practices, such as weed and insect control, will also be used.

Irrigation and fertilization may be used during the first two growing seasons to enhance vegetation establishment. It is unlikely fertilization will have a significant effect on vegetation establishment, but irrigation could. Results from the test plot concerning irrigation are not conclusive, but if done right, irrigation could increase vegetation establishment. Before approving irrigation, the Division would need to know the quality of the water, how much and how frequently reclaimed areas would be irrigated, and how water would be applied.

Rule R645-301-357.300 discusses husbandry practices that may be used during the extended responsibility period. The methods discussed in the mining and reclamation plan are acceptable, but

they could restart the extended responsibility period for particular areas. The permittee needs to be aware of these restrictions.

Standards for Success

The mine disturbed area includes areas disturbed both before and after passage of the Surface Mining Control and Reclamation Act. For areas disturbed before 1977, the plan says that since no vegetation existed on these areas in prior years, any vegetation as a result of the permittee's revegetation efforts will be considered a success.

The assumption that areas disturbed before 1977 only need to have as much vegetation as existed when the law was passed is not correct. Regulation R645-301-356.250 says that for areas previously disturbed by mining that were not reclaimed to the requirements of the coal rules and that are remined or otherwise redisturbed by coal mining and reclamation operations, at a minimum, the vegetative ground cover will be not less than the ground cover existing before redisturbance and will be adequate to control erosion. This rule gives no exceptions to the general requirements standards of R645-301-353, and the land needs to be suitable for the postmining land uses. Chapter X identifies these uses as wildlife and grazing. The vegetation must also be diverse and capable of stabilizing the surface from erosion. The permittee needs to propose success standards for the areas disturbed by mining before 1977.

According to Section VIII.C.9, three reference areas were set up as revegetation success standards for areas disturbed after 1977. Section VIII.A and Plate VIII-1 indicate there is a fourth reference area in a pinyon/juniper community. Section VIII.A shows the sizes of these reference areas, and the locations are shown on Plate VIII-1.

The discrepancy between Sections VIII.C.9 and VIII.A and Plate VIII-1 needs to be resolved. Based on the disturbance areas and vegetation communities shown on Plate VIII-1, it does not appear there are any areas that would need to be compared with a pinyon/juniper reference area.

The Division requires that reference areas be at least one acre, and the largest reference area is only about one-fourth acre. The plan contains no information indicating whether the Natural Resources Conservation Service has evaluated the range condition of the reference areas. They need to be in fair or better range condition for the Division to accept them as revegetation success standards. Even if the reference areas were evaluated at some time in the past, it would be best to check them again. The plan does not say whether the reference area locations were marked, but this should also be checked.

In Section VIII.C.9, the plan shows which disturbed areas of the mine would be compared with which reference areas, but the pinyon/juniper reference area is not included. If the pinyon/juniper reference area is to be used as a success standard, the plan needs to show which areas would be compared with this standard.

The permittee needs to propose success standards and methods for measuring erosion control, diversity, and seasonality. The regulations require that the vegetation be diverse, capable of controlling erosion, and that it have the same seasonal characteristics as the native vegetation, but they do not give standards or ways of measuring these parameters like the standards and methods provided for cover and density. There are several methods of making these measurements, and the permittee is encouraged to contact the Division to discuss potential methods.

Fish and Wildlife

The species in the revegetation plan meet the requirements of R645-301-342. Not all of these species are particularly palatable, but there must be a balance between those species adapted to the site and the species best for wildlife.

The plan does not discuss enhancing the area for wildlife habitat during reclamation. Limited opportunities appear to be available to enhance the site for wildlife, particularly along the streams. Most of these areas have a lot of tamarisks and would offer better wildlife habitat if it was possible to replace these with willows. The permittee needs to investigate what other enhancement options are available.

If enhancement is not feasible, the plan needs to discuss what options were considered and why they are not planned.

Findings:

Information in the mining and reclamation plan is not adequate to meet the requirements of this section of the regulations. Prior to final approval, the applicant must provide the following in accordance with:

R645-301-341, Section III.B.1 says soils under the roads *may* (emphasis added) be tested for physical and chemical parameters. No area should be excluded from soil testing.

R645-301-341, The surface preparation techniques need to be revised. It is vital that the permittee use the best methods available to increase the amount of available water. This could be done with limited surface roughening and irrigation, but if irrigation is not used, it will probably be necessary to implement extreme surface roughening, such as gouging pits about 12-18 inches deep and three feet in diameter. The plan also needs to show how compaction will be reduced and seed spread as soon as possible after surface preparation techniques are completed in an area.

R645-301-341.100, The normal time for seeding is most areas of Utah is in the fall although some mid-summer seeding is probably feasible in some locations to try to establish warm season species. Unless the permittee can show that seeding at other times is feasible, the portions of the plan discussing timing of the seeding operations need to be modified.

R645-301-341.210, The amount of yellow sweet clover in the seed mix needs to be reduced. The Division recommends other changes to the seed mixes based on test plot results, and the permittee should consider planting seedlings of some species, such as fourwing saltbush and mat saltbush.

R645-301-341.220, The mining and reclamation plan indicates shrub and grass seed will be drill seeded, but drilling tends to reduce surface roughening which the Division considers critical at this site. Also, some species in the seed mixes either need to

have light or must be near the surface to germinate and establish, and these requirements are not compatible with drill seeding. The permittee needs to propose seeding methods that will not reduce roughening or bury seeds too deeply.

R645-301-341.230, The plan says the straw or hay mulch will be anchored by crimping but it needs to say what crimping or other anchoring method will be used. Crimping with the teeth of a backhoe or trackhoe is not very effective, and crimping with a disk reduces the amount of surface roughening. Alternative methods include putting netting over the straw or hydromulching with just enough wood fiber and tackifier to hold the mulch down.

R645-301-341.250, The permittee needs to propose success standards for the areas disturbed by mining before 1977.

R645-301-341.250, The plan needs to contain success standards and methods for measuring diversity, seasonality, and erosion control.

R645-301-341.250, Section VIII.C.9 says three reference areas were set up as revegetation success standards for areas disturbed after 1977, but Section VIII.A and Plate VIII-1 indicate there is a fourth reference area in a pinyon/juniper community. These portions of the plan need to be consistent. Also, the reference areas are not as large as required.

R645-301-341.250, The plan gives no indication whether the reference areas have ever been checked for range condition by the Soil Conservation Service or the Natural Resources Conservation Service. To be acceptable, they need to be in fair or better range condition.

R645-301-342, The plan needs to show the permittee is using the best technology currently available to enhance wildlife habitat during reclamation. If enhancement is not feasible, the plan needs to contain a statement to this effect and discuss why it is not feasible.

In addition to these requirements, this analysis contains several recommendations for changes to the revegetation plan.

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